UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
		10/081,220	JORDAN ET AL.
Office Action Summary		Examiner	Art Unit
		Russ Guill	2123

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/24/2006*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39 and 41-69* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39 and 41-48, 50-69* is/are rejected.

7)☐ Claim(s) *1,29,31,37,44, 49, 55* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This Office Action is in response to an <u>Amendment</u> filed February 24, 2006. Claim 40 was canceled. No claims were added. Claims 1 – 39 and 41 – 69 are pending. Claims 1 – 39 and 41 – 69 have been examined. Claims 1 – 39, 41 – 48 and 50 - 69 have been rejected. Claims 1, 29, 31, 37, 44, 49 and 55 are objected to.

2.   **<u>The Examiner would like to thank the Applicant for the careful analysis in the</u>** **<u>well-presented response, which was useful to expedite the examination process</u>**.

Response to Remarks

3.   Regarding **claims 28 and 65** rejected under 35 USC § 112:

    a.   Applicant's amendments overcome the rejection.

4.   Regarding **claims 1, 29, 37, 44 and 55** rejected under 35 USC § 102/103:

    a.   Applicant's amendments overcome the rejections, however, upon further search and consideration, new rejections have been made under 35 USC § 103 necessitated by Applicant's amendments.

    b.   In order to expedite future examination, the Examiner would like to note that the MPEP recites that automating a manual activity is not sufficient to distinguish over the prior art (MPEP, 2144.04, III Automating a manual activity).

5.   Regarding **claim 49** rejected under 35 USC § 103:

    a.   Applicant's arguments, see page 28, have been fully considered, and are persuasive. Accordingly, the rejection of claim 49 is withdrawn.

Claim Objections

6.   **Claim 1** is objected to for the following informalities: The claim recites in line 11, "Executing bracket selection software for selecting . . ." The phrase appears to recite an intended use.

7.   **Claim 29** is objected to for the following informalities: The claim recites in line 13, "Executing bracket selection software for selecting . . ." The phrase appears to recite an intended use.

8.   Claim **31** is objected to for the following informalities: The claim recites in line 2, "<u>one or more the</u> desired final tooth positions." The phrase appears to need the word "of." Appropriate correction is required.

9.   Claim **37** is objected to for the following informalities: The claim recites in line 16, "Executing a computer-implemented bracket selection process for selection . . ." The phrase appears to recite an intended use.

10. Claim **44** is objected to for the following informalities: The claim recites in line 12, "Executing bracket selection software for selecting . . ." The phrase appears to recite an intended use.

11. Claim **55** is objected to for the following informalities: The claim recites in line 15, "Executing bracket selection software for selecting . . ." The phrase appears to recite an intended use.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. **Claims 1 – 18 and 26 – 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemchen (U.S. Patent Number 5,011,405), in view of Taub (U.S. Patent Number 6,739,869), further in view of Sachdeva (U.S. Patent Number 6,739,869).

   a. **Regarding claim 1**, Lemchen teaches:

       i.   providing tooth/arch model data (**column 2, lines 55 – 60**);

       ii.   defining a three-dimensional maloccluded tooth/arch model using the tooth/arch model data as a function of patient information (**column 3, lines 1 – 18**);

       iii.   receive from a user prescription data representative of user-specified desired final positions for one or more teeth of the defined three-dimensional maloccluded

tooth/arch model (column 3, lines 31 – 38; it would have been obvious that the user (the orthodontist) provides user-specified desired final positions (results));

iv.   providing bracket data representative of one or more parameters defining a plurality of predefined and existing orthodontic brackets (column 3, lines 62 – 68; in the cited lines, it is inherent that bracket data is provided).

v.   selecting one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the user-specified desired final positions based on at least the prescription data (column 4, lines 47 – 54; column 3, lines 31 - 36; from column 3, lines 31 – 36, it would have been obvious that the desired final positions were user-specified).

b.   Regarding claim 1, Lemchen does not specifically teach:

i.   *Presenting a user interface to* receive from a user prescription data.

ii.   *Executing bracket selection software* for selecting one or more of the plurality of predefined and existing orthodontic brackets.

c.   Regarding claim 1, Taub teaches:

i.   Presenting a user interface (column 2, lines 41 – 56; and column 2, lines 30 – 35);

d.   Regarding claim 1, Sachdeva teaches:

i.   Executing bracket selection software for selecting one or more of the plurality of predefined and existing orthodontic brackets (column 7, lines 43 - 49);

e.   The motivation to use the art of Sachdeva with the art of Lemchen would have been the benefit recited in Sachdeva that the invention allows treatment to be monitored and adjusted as needed by the system in an efficient manner (column 8, lines 16 – 23), which would have been recognized by the ordinary artisan as saving time and cost.

f.   The motivation to combine the art of Taub with the art of Lemchen would have been the benefit recited in Taub that the invention provides a tool for visual demonstration, design or prediction of the outcome of an orthodontic treatment (column 1, lines 29 – 34).

g.   Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Lemchen with the art of Taub and the art of Sachdeva to produce the claimed invention.

h.   Regarding claim 2, Lemchen teaches:

        i.   selecting one or more of the plurality of predefined and existing orthodontic brackets that move the one or more teeth of the defined three-dimensional maloccluded tooth/arch model at least close to, but not necessarily exactly to, the desired final positions represented by the prescription data **(column 3, lines 30 – 42)**;

i. **Regarding claim 2, Lemchen does not specifically teach:**

        i.   wherein the method further comprises repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets.

j. **Regarding claim 2, Taub teaches:**

        i.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets **(column 2, lines 41 – 56; and column 2, lines 30 – 35)**;

k. **Regarding claim 3, Taub teaches:**

        i.   displaying the repositioned one or more teeth of the defined three-dimensional maloccluded tooth/arch model with the selected predefined and existing orthodontic brackets **(figure 10B)**.

l. **Regarding claim 4, Taub teaches:**

        i.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data **(column 2, lines 30 – 40)**; and

        ii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model as repositioned for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data **(column 2, lines 30 – 40)**.

m. **Regarding claim 5, Taub teaches:**

        i.   Receiving input from the user **(column 4, lines 45 – 47, user interface)** modifying the selection of the one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions based on the comparison **(column 2, lines 30 – 40, and column 3, lines 50 - 57)**.

n. **Regarding claim 6, Taub teaches:**

    i.   providing archwire data representative of one or more parameters defining a plurality of predefined and existing orthodontic archwires (column 9, lines 16 – 24); and

    ii.   selecting at least one of the plurality of predefined and existing orthodontic archwires for use in moving the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions (column 9, lines 16 – 24).

o. **Regarding claim 7, Taub teaches:**

    i.   wherein selecting one or more of the plurality of predefined and existing orthodontic brackets comprises selecting one or more of the plurality of predefined and existing orthodontic brackets that move the one or more teeth of the defined three-dimensional maloccluded tooth/arch model at least close to, but not necessarily exactly to, the desired final positions represented by the prescription data (column 9, lines 24 – 41); and

    ii.   wherein the method further comprises repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected one or more predefined and existing orthodontic brackets and archwire data representative of the selected at least one predefined and existing orthodontic archwire (column 9, lines 24 – 41).

p. **Regarding claim 8, Taub teaches:**

    i.   wherein the method further comprises displaying the repositioned one or more teeth of the defined three-dimensional maloccluded tooth/arch model with the selected one or more predefined and existing orthodontic brackets interacting with the selected at least one predefined and existing orthodontic archwire (column 9, lines 24 – 41).

q. **Regarding claim 9, Taub teaches:**

    i.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (column 9, lines 24 – 41); and

    ii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model as repositioned for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (column 9, lines 24 – 41).

r. **Regarding claim 10, Taub teaches:**

      i.   modifying at least the selection of the one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions based on the comparison (**column 9, lines 24 – 41**).

s. **Regarding claim 11, Taub teaches:**

      i.   repeatedly providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model as repositioned based on the bracket data representative of multiple modified selections of one or more orthodontic brackets for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (**column 9, lines 12 – 41**); and

      ii.   modifying, after each comparison, at least the selection of the one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions (**column 9, lines 12 – 41**).

t. **Regarding claim 12, Taub teaches:**

      i.   defining the three-dimensional maloccluded tooth/arch model using the model data as a function of patient information comprises providing a user input interface to a user to allow input (**column 4, lines 45 – 47**) of one or more characteristics associated with a patient (**column 2, lines 25 – 30**).

u. **Regarding claim 13, Taub teaches:**

      i.   The method of claim 12, wherein the one or more characteristics comprise at least one of gender, age, race, tooth size, arch size, impression information, and arch shape (**column 2, lines 25 – 30**).

v. **Regarding claim 14, Taub teaches:**

      i.   The method of claim 1, wherein the one or more teeth of the defined three-dimensional maloccluded tooth/arch model comprise individual separated three-dimensional models of teeth (**figure 10C**).

w. **Regarding claim 15, Taub teaches:**

      i.   providing a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model for a patient (**column 9, lines 10 – 15**);

        ii.   providing one or more patient images representative of the patient's actual teeth for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model (column 9, lines 10 – 15); and

        iii.   modifying the defined three-dimensional maloccluded tooth/arch model based on the comparison (column 9, lines 30 – 45).

x. **Regarding claim 16, Taub teaches:**

        i.   The method of claim 15, wherein the one or more patient images comprise at least one of two-dimensional images and three-dimensional images of one or more portions of the patient's teeth (column 9, lines 10 – 15).

y. **Regarding claim 17, Taub teaches:**

        i.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model for a patient (column 9, lines 10 – 15); and

        ii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (column 9, lines 30 – 45).

z. **Regarding claim 18, Taub teaches:**

        i.   changing patient information or prescription data resulting in a modification to the representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model or the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (column 9, lines 30 – 45).

aa. **Regarding claim 26, Taub teaches:**

        i.   selecting one or more of the plurality of predefined and existing orthodontic brackets based on at least the prescription data comprises providing a user input interface to a user allowing the user to provide or modify one or more prescription bracket selection criteria (column 9, lines 15 – 20), wherein the one or more prescription bracket selection criteria comprise at least one of torque (column 6, lines 21 – 23), angulation, and in/out value.

bb. **Regarding claim 27, Taub teaches:**

        i.   selecting one or more of the plurality of predefined and existing orthodontic brackets based on at least the prescription data comprises selecting one or more of the plurality of predefined and existing orthodontic brackets based on at least the prescription data and also based on an adjustment to at least one of torque or angulation

due to the interaction of an archwire with slots of selected brackets (**column 6, lines 21 –
24**).

cc. **Regarding claim 28, Taub teaches:**

    i.   selecting one or more of the plurality of predefined and existing orthodontic

brackets comprises selecting one or more of the plurality of predefined and existing

orthodontic brackets from the database using one or more prescription bracket selection

criteria, wherein the one or more prescription bracket selection criteria comprise at least

one of torque (**column 6, lines 21 – 24**), angulation , and in/out value.

14. Claims 19 - 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemchen in view of

Taub, further in view of Sachdeva as applied to **claims 1 – 18 and 26 – 28 above**, further in view of

Mortenson (Mortenson, Michael E.; "Geometric Modeling", 1985, John Wiley & Sons).

    a.   Lemchen as modified by Taub and Sachdeva teach the computer-implemented method of

orthodontic appliance selection as recited in **claims 1 – 18 and 26 – 28 above**.

    b. **Regarding claim 19, Lemchen teaches:**

        i.   providing a representation of the one or more teeth of the defined three-

dimensional maloccluded tooth/arch model for a patient in final positions (**column 3,
lines 20 – 25**).

        ii.   Prescription data (**column 3, lines 32 – 36**).

        iii.   Desired final positions (**column 3, lines 32 – 36**).

    c. **Regarding claim 19, Lemchen does not specifically teach:**

        i.   providing a global coordinate system on a surface of at least one archwire of the

three-dimensional tooth/arch model, the archwire corresponding to an arch form of the

patient;

        ii.   defining a local coordinate system at a facial axis point of each tooth of the three-

dimensional tooth/arch model;

        iii.   placing the local coordinate system corresponding to each tooth relative to the

global coordinate system to a position in the three-dimensional tooth/arch model based

at least in part on the prescription data; and

        iv.   attaching each tooth to the corresponding placed local coordinate system.

    d. **Regarding claim 19, Taub teaches:**

     i.   providing a global coordinate system *relative to* at least one archwire of the three-dimensional tooth/arch model, the archwire corresponding to an arch form of the patient **(figures 6A and 6C and 10B)**;

     ii.   defining a local coordinate system at a facial axis point of each tooth of the three-dimensional tooth/arch model **(figure 5d and figure 7, third box that starts with "PLACE BRACKET ON")**;

     iii.   placing the local coordinate system corresponding to each tooth relative to the global coordinate system to a position in the three-dimensional tooth/arch model based at least in part on the prescription data **(figure 8, boxes 81 and 82)**; and

     iv.   attaching each tooth to the corresponding placed local coordinate system **(figure 8, boxes 81 and 82)**.

e. **Regarding claim 19, Mortenson teaches:**

     i.   providing a global coordinate system *on a surface of* curve **(pages 272 – 273, section 1.7 Moving Trihedron; and page 272, figure 5.5)**.

f. The motivation to combine the art of Mortenson with the art of Lemchen as modified by Taub and Sachdeva would have been the benefit recited in Mortenson of using geometric modeling methods to construct a precise mathematical description of the shape of a real object **(Mortenson, page 1, third paragraph)**.

g. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Mortenson with the art of Lemchen as modified by Taub and Sachdeva to produce the claimed invention.

h. **Regarding claim 20, Taub teaches:**

     i.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets, wherein the repositioning of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on at least bracket data comprises changing the placement of the local coordinate system relative to the global coordinate system for each tooth and attaching each tooth to the new placement of the local coordinate system **(column 9, lines 30 – 45)**.

i. **Regarding claim 21, Lemchen does not specifically teach:**

     i.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets, wherein the repositioning of

the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on at least bracket data comprises:

ii.   providing a global coordinate system relative to the surface of at least one archwire of the three-dimensional tooth/arch model, the archwire corresponding to an arch form of the patient ;

iii.   defining a local coordinate system at a facial axis point of each tooth of the three-dimensional tooth/arch model;

iv.   placing the local coordinate system corresponding to each tooth relative to the global coordinate system to a position defined at least in part by at least the bracket data representative of the selected one or more predefined orthodontic brackets; and attaching each tooth to the corresponding placed local coordinate system.

j.   **Regarding claim 21, Taub teaches:**

i.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets (column 9, lines 30 – 45), wherein the repositioning of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on at least bracket data comprises:

ii.   providing a global coordinate system on a surface of at least one archwire of the three-dimensional tooth/arch model, the archwire corresponding to an arch form of the patient (figures 6A and 6C and 10B);

iii.   defining a local coordinate system at a facial axis point of each tooth of the three-dimensional tooth/arch model (figure 5d and figure 7, third box that starts with "PLACE BRACKET ON");

iv.   placing the local coordinate system corresponding to each tooth relative to the global coordinate system to a position defined at least in part by at least the bracket data representative of the selected one or more predefined orthodontic brackets (figure 8, boxes 81 and 82); and

v.   attaching each tooth to the corresponding placed local coordinate system (figure 8, boxes 81 and 82).

k.   **Regarding claim 22, Taub teaches:**

i.   The method of claim 19, wherein the local coordinate system for each tooth initially coincides with the global coordinate system (xyz) (figures 5D and 6A and 6C and 10B), where x is in the direction of the archwire (figure 5D), y is in the occlusal

direction (**figure 5D**), and z is in the lingual direction (**figure 5D**), wherein placing the local coordinate system corresponding to each tooth to a position defined at least in part by at least the prescription data comprises:

ii.   translating the local coordinate system of each tooth, relative to the global coordinate system, along the archwire based on tooth type to provide a first local coordinate system, the first local coordinate system comprising $x_1y_1z_1$ (**figure 10C**);

iii.   rotating the first local coordinate system of each tooth such that z, is perpendicular to an inner surface of the archwire to provide a second local coordinate system $x_2y_2z_2$ (**figure 10C**);

iv.   translating the second local coordinate system in the lingual direction by a distance along z_2 corresponding to the in/out of the prescription data to provide a third local coordinate system $x_3y_3z_3$ (**figure 10C**);

v.   rotating the third local coordinate system by an angle with respect to z_3 corresponding to angulation of the prescription data to provide a fourth local coordinate system $x_4y_4z_4$ (**figure 10C**); and

vi.   rotating the fourth local coordinate system by an angle with respect to x_4 corresponding to a torque of the prescription data to provide a fifth local coordinate system $x_5y_5z_5$ (**figure 10C**);.

l.   **Regarding claim 23, Taub teaches:**

i.   providing archwire data representative of one or more parameters defining a plurality of predefined and existing orthodontic archwires (**column 2, lines 41 – 56; and column 2, lines 30 – 35**);

ii.   selecting at least one of the plurality of predefined and existing archwires for use in moving the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions (**column 9, lines 15 – 45**); and

iii.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected one or more predefined and existing orthodontic brackets and archwire data representative of the selected at least one predefined and existing orthodontic archwire (**column 9, lines 15 – 45**).

m. **Regarding claim 24, Taub teaches:**

      i.   repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model to positions based on at least bracket data representative of the selected predefined and existing orthodontic brackets, wherein the repositioning of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on at least bracket data comprises providing a representation of at least teeth of the selected three-dimensional tooth/arch model in positions defined by the selected prescription along with the selected predefined and existing orthodontic brackets (**column 9, lines 15 – 45**).

n.   **Regarding claim 25, Taub teaches:**

      i.   providing a global coordinate system *relative to* a surface of an archwire of the three-dimensional tooth/arch model (**figures 6A and 6C and 10B**);

      ii.   defining a local coordinate system having an origin located on a bottom surface of a base relative to an archwire slot center of each selected predefined and existing orthodontic bracket (**figure 5B**);

      iii.   placing the local coordinate system corresponding to each of the selected predefined and existing orthodontic brackets relative to the global coordinate system to a position defined at least in part by the bracket data (**figures 5B and 10C**); and

      iv.   attaching each bracket to the corresponding placed local coordinate system (**figures 5B and 10C**).

15. Claims 29 – 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taub (U.S. Patent Number 6,739,869), in view of Mortenson (Mortenson, Michael E.; "Geometric Modeling", 1985, John Wiley & Sons), further in view of Sachdeva (U.S. Patent Number 6,739,869).

a.   **Regarding claim 29, Taub teaches:**

      i.   A method for use in orthodontia (**Abstract**).

      ii.   providing model data representative of at least one or more teeth (**column 2, lines 26 – 30**);

      iii.   providing archwire data representative of at least an archwire (**column 2, lines 41 – 56; and column 2, lines 30 – 35**);

      iv.   providing position data defining one or more tooth positions (**column 2, lines 26 – 30**); and

      v.   providing a representation of the one or more teeth (**column 2, lines 26 – 30**), wherein

          vi.   providing the representation comprises:

               (1) providing a global coordinate system <u>relative to</u> the archwire (**figures 6a and 6c**);

               (2) defining a local coordinate system for each of the one or more teeth at a facial axis point of each of the one or more teeth (**figure 5d and figure 7, third box that starts with "PLACE BRACKET ON"**);

               (3) placing the local coordinate system corresponding to each tooth relative to the global coordinate system to a position defined at least in part by the position data (**figure 8, boxes 81 and 82**); and

               (4) attaching each tooth to the corresponding moved local coordinate system (**figure 8, boxes 81 and 82**).

b. **Regarding claim 29, Taub does not specifically teach:**

        i.   providing a global coordinate system ***on a surface of*** the archwire;

        ii.   executing bracket selection software for selecting one or more of a plurality of predefined orthodontic brackets for use in moving one or more teeth to user-specified desired final positions.

c. **Regarding claim 29, Mortenson teaches:**

        i.   providing a global coordinate system ***on a surface of*** curve (**pages 272 – 273, section 1.7 Moving Trihedron; and page 272, figure 5.5**).

d. **Regarding claim 29Sachdeva teaches:**

        i.   executing bracket selection software for selecting one or more of a plurality of predefined orthodontic brackets for use in moving one or more teeth to user-specified desired final positions (**column 7, lines 43 - 49**).

e. The motivation to use the art of Sachdeva with the art of Taub would have been the benefit recited in Sachdeva that the invention allows treatment to be monitored and adjusted as needed by the system in an efficient manner (**column 8, lines 16 – 23**), which would have been recognized by the ordinary artisan as saving time and cost.

f. The motivation to combine the art of Mortenson with the art of Taub would have been the benefit recited in Mortenson of using geometric modeling methods to construct a precise mathematical description of the shape of a real object (**Mortenson, page 1, third paragraph**).

g.   Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Mortenson with the art of Taub and the art of Sachdeva to produce the claimed invention.

h.   **Regarding claim 30, Taub teaches:**

   i.   translating the local coordinate system of each tooth, relative to the global coordinate system (xyz), where x is in the direction of the archwire, y is in the occlusal direction, and z is in the lingual direction along the archwire, wherein the translation is based on tooth type to provide a first local coordinate system, the first local coordinate system comprising $x.sub.1y.sub.1z.sub.1$ **(Figure 10C);**

   ii.   rotating the first local coordinate system of each tooth such that $z.sub.1$ is perpendicular to an inner surface of the archwire to provide a second local coordinate system $x.sub.2y.sub.2z.sub.2$ **(Figure 10C);**

   iii.   translating the second local coordinate system in the lingual direction by a distance along $z.sub.2$ corresponding to the in/out of the position data to provide a third local coordinate system $x.sub.3y.sub.3z.sub.3$ **(Figure 10C);**

   iv.   rotating the third local coordinate system by an angle with respect to $z.sub.3$ corresponding to angulation of the position data to provide a fourth local coordinate system $x.sub.4y.sub.4z.sub.4$ **(Figure 10C);** and

   v.   rotating the fourth local coordinate system by an angle with respect to $x.sub.4$ corresponding to a torque of the position data to provide a fifth local coordinate system $x.sub.5y.sub.5z.sub.5$ **(Figure 10C).**

i.   **Regarding claim 31, Taub teaches:**

   i.   the position data comprises prescription data defining one or more the desired final tooth positions **(column 6, lines 12 – 17).**

j.   **Regarding claim 32, Taub teaches:**

   i.   the position data comprises bracket data representative of one or more parameters defining one or more of the orthodontic brackets **(column 6, lines 30 - 37).**

k.   **Regarding claim 33, Taub teaches:**

   i.   the representation of one or more teeth is a three-dimensional maloccluded tooth/arch model **(column 4, lines 12 – 17).**

l.   **Regarding claim 34, Taub teaches:**

   i.   providing a representation of the orthodontic brackets with the representation of the one or more teeth **(column 4, lines 17 – 25).**

m.   **Regarding claim 35, Taub teaches:**

   i.   providing a global coordinate system (xyz) <u>relative to</u> the archwire of the three-dimensional tooth/arch model, where x is in the direction of the archwire, y is in the occlusal direction, and z is in the lingual direction **(figures 6A and 6C);**

        ii.   defining a local coordinate system having an origin located on a bottom surface of a base at a point relative to an archwire slot center of each orthodontic bracket (**figure 5B**);

        iii.   placing the local coordinate system corresponding to each of the orthodontic brackets relative to the global coordinate system to a position defined at least in part by bracket data representative of one or more parameters defining one or more orthodontic brackets (**figure 5B**); and

        iv.   attaching each bracket to the corresponding moved local coordinate system (**figure 8, boxes 81 and 82**).

n. **Regarding claim 35, Taub does not specifically teach:**

        i.   providing a global coordinate system (xyz) _on a surface of_ the archwire of the three-dimensional tooth/arch model, where x is in the direction of the archwire, y is in the occlusal direction, and z is in the lingual direction.

o. **Regarding claim 35, Mortenson teaches:**

        i.   providing a global coordinate system _on a surface of_ curve (**pages 272 – 273, section 1.7 Moving Trihedron; and page 272, figure 5.5**).

p. **Regarding claim 36, Taub teaches:**

        i.   translating the local coordinate system of each of the orthodontic brackets, relative to the global coordinate system, along the archwire based on tooth type to provide a first local coordinate system, wherein the first local coordinate system comprises $x_1y_1z_1$ (**figure 10C**);

        ii.   rotating the first local coordinate system of each bracket such that z_1 is perpendicular to an inner surface of the archwire to provide a second local coordinate system $x_2y_2z_2$ (**figure 10C**);

        iii.   translating the second local coordinate system in the lingual direction by a distance along z_2 corresponding to the in/out of the bracket data to provide a third local coordinate system $x_3y_3z_3$ (**figure 10C**);

        iv.   rotating the third local coordinate system by an angle with respect to z_3 corresponding to angulation of the bracket data to provide a fourth local coordinate system $x_4y_4z_4$ (**figure 10C**); and

        v.   rotating the fourth local coordinate system by an angle with respect to x_4 corresponding to a torque of the bracket data to provide a fifth local coordinate system $x_5y_5z_5$ (**figure 10C**).

16. Claims 37 – 39 and 41 – 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taub (U.S. Patent Number 6,739,869), in view of Lemchen (U.S. Patent Number 5,011,405), further in view of Sachdeva (U.S. Patent Number 6,739,869).

    a. **Regarding claim 37, Taub teaches:**

        i.   means for recognizing tooth/arch model data for use in defining a three-dimensional maloccluded tooth/arch model (**column 2, lines 26 – 30**);

        ii.   user interface means (**column 4, lines 45 – 48**) for allowing a user to define a three-dimensional maloccluded tooth/arch model as a function of patient information (**column 2, lines 26 – 30**);

        iii.   means for recognizing bracket data representative of one or more parameters defining a plurality of predefined and existing orthodontic brackets (**column 2, lines 41 – 56; and column 2, lines 30 – 35**);

        iv.   means for causing the display of a representation of the final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model (**column 4, lines 49 – 60**);

        v.   means for causing the display (**column 4, line 60**) of the selection of the one or more of the plurality of orthodontic brackets (**column 2, lines 41 – 56; and column 2, lines 30 – 35**);

        vi.   means for causing the display (**column 4, line 60**) of a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on bracket data representative of the selected one or more of the plurality of predefined and existing orthodontic brackets (**column 4, lines 49 – 60**).

    b. **Regarding claim 37, Taub does not specifically teach:**

        i.   user interface means for allowing a user to *define prescription data representative of desired final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model;*

        ii.   *means for executing a computer-implemented bracket selection process for selection of one or more of a plurality of predefined and existing orthodontic brackets that move the one or more teeth of the defined three-dimensional maloccluded tooth/arch model at least close to, but not necessarily exactly to, the user-defined desired final positions represented by the prescription data.*

      iii.   means for causing the display of a representation of the *desired* final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model *based on the prescription data*;

c. **Regarding claim 37, Lemchen teaches:**

      i.   *define prescription data representative of desired final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model* (column 3, lines 32 – 38);

      ii.   representation of the *desired* final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model *based on the prescription data* (column 3, lines 20 – 24).

      iii.   user-defined desired final positions represented by prescription data (column 3, lines 31 – 38)

d. **Regarding claim 37, Sachdeva teaches:**

      i.   means for executing a computer-implemented bracket selection process for selection of one or more of a plurality of predefined and existing orthodontic brackets that move the one or more teeth of the defined three-dimensional maloccluded tooth/arch model at least close to, but not necessarily exactly to, the desired final positions (column 7, lines 43 - 49);

e. The motivation to use the art of Sachdeva with the art of Taub would have been the benefit recited in Sachdeva that the invention allows treatment to be monitored and adjusted as needed by the system in an efficient manner (column 8, lines 16 – 23), which would have been recognized by the ordinary artisan as saving time and cost.

f. The motivation to combine the art of Lemchen with the art of Taub would have been the benefit recited in Lemchen of providing a treatment that is individualized for a patient instead of being manufactured to population averages (column 1, lines 35 – 51).

g. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Lemchen and the art of Sachdeva with the art of Taub to produce the claimed invention.

h. **Regarding claim 38, Taub teaches:**

      i.   the patient information comprises at least one of gender, age, race, tooth size, arch size, impression information, and arch shape (column 3, lines 45 – 50; age);

i. **Regarding claim 39, Taub teaches:**

      i.   means for providing a global coordinate system relative to a surface of an archwire of the three-dimensional tooth/arch model (**figures 6A and 6C**);

      ii.   means for defining a local coordinate system at a facial axis point of each tooth of the three-dimensional tooth/arch model (**figure 5D**);

      iii.   means for placing the local coordinate system corresponding to each tooth relative to the global coordinate system to a position defined at least in part by the prescription data (**figure 5D**); and

      iv.   means for attaching each tooth to the corresponding moved local coordinate system (**figure 8, boxes 81 and 82**).

j.   **Regarding claim 41, Taub teaches:**

      i.   means for causing display of one or more teeth of the defined three-dimensional maloccluded tooth/arch model for a patient (**column 4, lines 48 – 60**); and

      ii.   means for causing the display of one or more patient images representative of the patient's actual teeth for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model (**column 4, lines 48 – 60**).

k.   **Regarding claim 42, Taub teaches:**

      i.   the one or more teeth of the defined three-dimensional maloccluded tooth/arch model comprise individual separated three-dimensional models of teeth (**column 4, lines 12 – 17**).

17. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taub in view of Lemchen, further in view of Sachdeva as applied to **claims 37 – 42** above, in view of Mortenson (Mortenson, Michael E.; "Geometric Modeling", 1985, John Wiley & Sons).

a.   Taub as modified by Lemchen and Sachdeva teaches the computer readable medium tangibly embodying a program executable for use in selection of orthodontic appliances.

b.   **Regarding claim 43, Taub teaches:**

      i.   means for providing a global coordinate system <u>relative to</u> a surface of an archwire of the three-dimensional tooth/arch model (**figures 6A and 6C**);

      ii.   means for defining a local coordinate system having an origin located on a bottom surface of a base at a point relative to an archwire slot center of each selected predefined and existing orthodontic bracket (**figure 5B**);

      iii.   means for placing the local coordinate system corresponding to each of the selected predefined and existing orthodontic brackets relative to the global coordinate

system to a position defined at least in part by the bracket data representative of the selected predefined and existing orthodontic brackets (**figure 5B**); and

       iv.   means for attaching each bracket to the corresponding moved local coordinate system (**figure 8, boxes 81 and 82**).

   c. **Regarding claim 43, Taub does not specifically teach:**

       i.   means for providing a global coordinate system on a surface of an archwire of the three-dimensional tooth/arch model.

   d. **Regarding claim 43, Mortenson teaches:**

       i.   providing a global coordinate system *on a surface of* curve (**pages 272 – 273, section 1.7 Moving Trihedron; and page 272, figure 5.5**).

   e. The motivation to combine the art of Mortenson with the art of Taub as modified by Lemchen and Sachdeva would have been the benefit recited in Mortenson of using geometric modeling methods to construct a precise mathematical description of the shape of a real object (**Mortenson, page 1, third paragraph**).

   f. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Mortenson with the art of Taub as modified by Lemchen and Sachdeva to produce the claimed invention.

18. **Claims 44 – 48 and 50 - 54** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemchen (U.S. Patent Number 5,011,405), in view of Taub (U.S. Patent Number 6,739,869), further in view of Sachdeva (U.S. Patent Number 6,739,869).

   a. **Regarding claim 44, Lemchen teaches:**

       i.   providing tooth/arch model data for use in defining a three-dimensional maloccluded tooth/arch model (**column 2, lines 55 – 60**);

       ii.   allowing a user to define a three-dimensional maloccluded tooth/arch model as a function of patient information (**column 3, lines 1 – 18**);

       iii.   allowing a user to define prescription data representative of desired final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model (**column 3, lines 32 – 38**);

       iv.   providing bracket data representative of one or more parameters defining a plurality of predefined and existing orthodontic brackets (**column 3, lines 62 – 68**);

       v.   selecting one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-dimensional

maloccluded tooth/arch model to the desired final positions based on at least the

prescription data (**column 4, lines 47 – 54**).

b. Regarding claim 44, Lemchen does not specifically teach:

    i.   *providing a user interface for* allowing a user to define a three-dimensional

maloccluded tooth/arch model as a function of patient information;

    ii.   *providing a user interface for* allowing a user to define prescription data

representative of desired final tooth positions for one or more teeth of the defined three-

dimensional maloccluded tooth/arch model;

    iii.   *executing bracket selection software for* selecting one or more of the plurality of

predefined and existing orthodontic brackets *from a database* for use in moving one or

more teeth of the defined three-dimensional maloccluded tooth/arch model to the

desired final positions based on at least the prescription data.

c. Regarding claim 44, Taub teaches:

    i.   providing a user interface (**column 4, lines 45 – 48**);

    ii.   a database (**column 3, lines 35 – 37; and column 6, lines 39 - 40**).

d. Regarding claim 44, Sachdeva teaches:

    i.   Executing bracket selection software for selecting one or more of the plurality of

predefined and existing orthodontic brackets (**column 7, lines 43 - 49**);

e. The motivation to use the art of Sachdeva with the art of Lemchen would have been the

benefit recited in Sachdeva that the invention allows treatment to be monitored and adjusted as

needed by the system in an efficient manner (**column 8, lines 16 – 23**), which would have been

recognized by the ordinary artisan as saving time and cost.

f. The motivation to combine the art of Taub with the art of Lemchen would have been the

benefit recited in Taub that the invention provides a tool for visual demonstration, design or

prediction of the outcome of an orthodontic treatment (**column 1, lines 29 – 34**).

g. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time

of invention to use the art of Lemchen with the art of Taub and the art of Sachdeva to produce the

claimed invention.

h. **Regarding claim 45, Taub teaches:**

     i.   displaying a representation of the desired final tooth positions for one or more teeth of the defined three-dimensional maloccluded tooth/arch model based on the prescription data (**column 4, lines 47 – 60**); and

     ii.   displaying a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on bracket data representative of the selected predefined and existing orthodontic brackets (**column 4, lines 12 – 35**).

i.   **Regarding claim 46, Taub teaches:**

     i.   allowing the user to modify at least one of the displayed representations by selecting and dragging one of a bracket or tooth to a position (**figure 10B**).

j.   **Regarding claim 47, Taub teaches:**

     i.   providing sound representative of contact between teeth, between one or more teeth and one or more brackets, and/or between brackets (**figure 10C**).

k.   **Regarding claim 48, Taub teaches:**

     i.   providing a representation of selected predefined and existing orthodontic brackets with the representation of the one or more teeth in positions based on bracket data representative of the selected predefined and existing orthodontic brackets (**column 4, lines 12 – 35**).

l.   **Regarding claim 50, Taub teaches:**

     i.   providing a user input interface (**column 4, lines 45 – 46**) to the user allowing the user to input one or more characteristics associated with a patient (**column 4, lines 12 – 15**).

m.   **Regarding claim 51, Taub teaches:**

     i.   The method of claim 50, wherein the one or more characteristics comprises at least one of gender, age, race, tooth size, arch size, impression information, and arch shape (**column 3, lines 45 – 50; age**).

n.   **Regarding claim 52, Taub teaches:**

     i.   providing a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model for a patient (**column 4, lines 12 – 17**);

     ii.   providing one or more patient images representative of the actual teeth of the patient for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model (**figure 10C**); and

           iii.   modifying the defined three-dimensional maloccluded tooth/arch model based on the comparison (**column 4, lines 12 – 37**).

    o.   **Regarding claim 53, Taub teaches:**

           i.   The method of claim 52, wherein the one or more patient images comprise at least one of two-dimensional images and three-dimensional images of one or more portions of the patient's teeth (**column 4, lines 12 – 17**).

    p.   **Regarding claim 54, Taub teaches:**

           i.   providing a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model (**column 4, lines 12 – 17**);

           ii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (**column 4, lines 12 – 37**); and

           iii.   changing patient information or prescription data resulting in a modification to the representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model or the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (**column 4, lines 30 – 35**).

19. Claims **55 - 69** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemchen (U.S. Patent Number 5,011,405), in view of Taub (U.S. Patent Number 6,739,869), further in view of Sachdeva (U.S. Patent Number 6,739,869).

    a.   **Regarding claim 55, Lemchen teaches:**

           i.   providing tooth/arch model data representative of at least one or more teeth (**column 2, lines 55 – 60**);

           ii.   defining a three-dimensional maloccluded tooth/arch model using the tooth/arch model data as a function of patient information (**column 3, lines 1 – 18**);

           iii.   providing prescription data representative of user-specified desired final positions for one or more teeth of the defined maloccluded tooth/arch model (**column 3, lines 32 – 38; it would have been obvious that the user (the orthodontist) provides user-specified desired final positions (results)**));

           iv.   providing archwire data representative of one or more parameters defining a plurality of predefined and existing orthodontic archwires (**column 4, lines 31 – 36**);

> v.   providing bracket data representative of one or more parameters defining a
> plurality of predefined and existing orthodontic brackets (**column 3, lines 62 – 68**); and
> vi.   selecting one or more of the plurality of predefined and existing orthodontic
> brackets for use in moving one or more teeth of the defined three-dimensional
> maloccluded tooth/arch model to the desired final positions based on at least the
> prescription data (**column 4, lines 47 – 54**).

b.   **Regarding claim 55, Lemchen does not specifically teach:**

> i.   selecting at least one of the plurality of predefined and existing archwires for use
> in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch
> model to the desired final positions (**column 4, lines 26 – 36**);
> ii.   *executing bracket selection software for* selecting one or more of the plurality of
> predefined and existing orthodontic brackets.

c.   **Regarding claim 55, Taub teaches:**

> i.   selecting at least one of the plurality of predefined and existing archwires for use
> in moving one or more teeth of the defined three-dimensional maloccluded tooth/arch
> model to the desired final positions (**column 6, lines 38 – 42**);

d.   **Regarding claim 55, Sachdeva teaches:**

> i.   Executing bracket selection software for selecting one or more of the plurality of
> predefined and existing orthodontic brackets (**column 7, lines 43 - 49**);

e.   The motivation to use the art of Sachdeva with the art of Lemchen would have been the
benefit recited in Sachdeva that the invention allows treatment to be monitored and adjusted as
needed by the system in an efficient manner (**column 8, lines 16 – 23**), which would have been
recognized by the ordinary artisan as saving time and cost.

f.   The motivation to combine the art of Taub with the art of Lemchen would have been the
benefit recited in Taub that the invention provides a tool for visual demonstration, design or
prediction of the outcome of an orthodontic treatment (**column 1, lines 29 – 34**).

g.   Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time
of invention to use the art of Taub and the art of Sachdeva with the art of Lemchen to produce the
claimed invention.

h.   **Regarding claim 56, Taub teaches:**

      i.   The method of claim 55, wherein selecting one or more of the plurality of predefined and existing orthodontic brackets comprises selecting one or more of the plurality of predefined and existing orthodontic brackets that move the one or more teeth of the defined three-dimensional maloccluded tooth/arch model at least close to, but not necessarily exactly to, the desired final positions represented by the prescription data (**column 4, lines 12 – 37**); and

      ii.   wherein the method further comprises repositioning the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in positions based on at least bracket data representative of the selected one or more predefined and existing orthodontic brackets and archwire data representative of the selected at least one predefined and existing orthodontic archwires (**column 4, lines 12 – 37; and column 6, lines 29 – 52**).

i.   **Regarding claim 57, Taub teaches:**

      i.   The method of claim 56, wherein the method further comprises displaying the repositioned one or more teeth of the defined three-dimensional maloccluded tooth/arch model to the desired final positions based on at least bracket data representative of the selected one or more predefined and existing orthodontic brackets interacting with the selected at least one predefined and existing orthodontic archwires (**column 4, lines 47 – 60**).

j.   **Regarding claim 58, Taub teaches:**

      i.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions represented by the prescription data (**column 4, lines 12 – 37**); and

      ii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model as repositioned based on at least the bracket data and the archwire data for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final positions (**column 4, lines 12 – 37**).

k.   **Regarding claim 59, Taub teaches:**

      i.   The method of claim 58, wherein the method further comprises modifying at least the selection of the one or more of the plurality of predefined and existing orthodontic brackets for use in moving one or more teeth of the defined three-

dimensional maloccluded tooth/arch model to the desired final positions based on the comparison (**column 4, lines 30 – 35**).

l.   **Regarding claim 60, Taub teaches:**

  i.   The method of claim 55, wherein defining a three-dimensional maloccluded tooth/arch model using the model data as a function of patient information comprises providing a user input interface to a user allowing the user to input one or more characteristics associated with a patient (**column 4, lines 12 – 17; and column 4, lines 45 – 47**).

m.   **Regarding claim 61, Taub teaches:**

  i.   The method of claim 60, wherein the one or more characteristics comprises at least one of gender, age, race, tooth size, arch size, impression information, and arch shape (**column 3, lines 45 – 50 – age**).

n.   **Regarding claim 62, Taub teaches:**

  i.   The method of claim 55, wherein the one or more teeth of the defined three-dimensional maloccluded tooth/arch model comprise individual separated three-dimensional models of teeth (**figure 10B**).

o.   **Regarding claim 63, Taub teaches:**

  i.   The method of claim 55, wherein selecting one or more of the plurality of predefined and existing orthodontic brackets based on at least the defined three-dimensional maloccluded tooth/arch model and the defined prescription data comprises providing a user input interface to a user allowing the user to provide or modify one or more prescription bracket selection criteria (**column 6, lines 30 – 32; and column 7, lines 23 – 25**), wherein the one or more prescription bracket selection criteria comprise at least one of torque (**column 6, lines 20 – 24 – angular moment**), angulation, and in/out value.

p.   **Regarding claim 64, Taub teaches:**

  i.   The method of claim 55, wherein selecting one or more of the plurality of predefined and existing orthodontic brackets comprises selecting one or more of the plurality of predefined and existing orthodontic brackets based on at least the prescription data (**column 7, lines 24 – 28**) and also based on an adjustment to at least one of torque or angulation due to the interaction of an archwire with slots of selected brackets (**column 6, lines 20 – 24 – angular moment**).

q.   **Regarding claim 65, Taub teaches:**

      i.   The method of claim 55, wherein selecting one or more of the plurality of predefined and existing orthodontic brackets comprises selecting one or more of the plurality of predefined and existing orthodontic brackets from the database using one or more prescription bracket selection criteria (column 7, lines 24 – 28), wherein the one or more prescription bracket selection criteria comprise at least one of torque (column 6, lines 20 – 24 – angular moment), angulation, and in/out value.

r.   **Regarding claim 66, Lemchen teaches:**

      i.   The method of claim 55, wherein the plurality of predefined and existing orthodontic brackets comprises a plurality of predefined and existing orthodontic brackets precoated with a precoat adhesive material (column 4, lines 47 – 50).

s.   **Regarding claim 67, Taub teaches:**

      i.   The method of claim 55, wherein the method further comprises:

      ii.   providing a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model for a patient (column 4, lines 12 – 17);

      iii.   providing one or more patient images representative of actual teeth of the patient for use in comparison to the representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model (column 4, lines 12 – 17); and

      iv.   modifying the defined three-dimensional maloccluded tooth/arch model based on the comparison (column 4, lines 12 – 35).

t.   **Regarding claim 68, Taub teaches:**

      i.   The method of claim 67, wherein the one or more patient images comprise at least one of two-dimensional images and three-dimensional images of one or more portions of the patient's teeth (column 4, lines 12 – 17).

u.   **Regarding claim 69, Taub teaches:**

      i.   The method of claim 55, wherein the method further comprises:

      ii.   providing a representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model (column 4, lines 12 – 17);

      iii.   providing a representation of the one or more teeth of the defined three-dimensional maloccluded tooth/arch model in desired final position represented by the prescription data (column 4, lines 12 – 35); and

      iv.   changing patient information or prescription data resulting in a modification to the representation of one or more teeth of the defined three-dimensional maloccluded tooth/arch model or the representation of the one or more teeth of the defined three-

dimensional maloccluded tooth/arch model in desired final positions represented by the
prescription data (**column 4, lines 12 – 35**).

Allowable Subject Matter

20. **Claim 49** is objected to as being dependent upon a rejected base claim, but would be allowable if
rewritten in independent form including all of the limitations of the base claim and any intervening
claims.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.
Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the
extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from

the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

shortened statutory period, then the shortened statutory period will expire on the date the advisory

action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing

date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX

MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell L. Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday – Friday 9:30 AM – 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Russ Guill
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